Moving to Predictive Maintenance to Improve Productivity





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Moving to Predictive Maintenance to Improve Productivity



Moving to Predictive Maintenance Improves Productivity Solutions that lets you know when it's time for service





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Moving to Predictive Maintenance Improves Productivity



Scheduled maintenance helps keep the system up and running.

- Good baseline
- Cost-effective?
- Does it catch everything?

What if you could detect issues before they causes downtime?

- Overheating, vibration, energy consumption
- Health of individual components
 - IGBTs
 - Filters
 - Capacitors

Prepare for success by moving from preventative to predictive maintenance.

Evaluate what's happening in real time to address issues before your system goes down.





Agenda

Industry Challenges

- History of maintenance strategies
- Transition to predictive maintenance
- Benefits to predictive maintenance
- Conclusion



Industry Challenges



F&B industry focus and KPIs

Food safety & product quality are two important KPIs that ingredient processing, F&B processing & packaging industries need to properly consider in order to avoid any food recalls.



Costs

TCO, OEE, Continuous operation, utilities, speed and flexibility.



Safety Food safety, Supply safety and value chain



Quality

Product quality, Power quality, production reliability



Sustainability

Efficiency, Energy savings, Water savings, reduce Waste & Scrap

Digitalization

New business models, Industry 4.0, Connectivity, Big Data

Key challenges Impacts of food recalls

Millions of pounds of food are recalled every year around the world, financially impacting the industry between **\$10 - \$30 million** in revenue losses.

Processing defects can happen due to fluctuations or downtime in the power supply.



History of Maintenance Strategies





Maintenance Strategies

- **Corrective maintenance** or run-to-failure: do maintenance only when problems occur.
- **Condition-based maintenance**, is a preventive maintenance supported by condition monitoring of the asset, with basic diagnosis on read values.
- Preventive maintenance regularly scheduled, using either time intervals, usage (operations/cycle count) as a trigger.
 It can be enhanced with root-cause analysis and troubleshooting instructions (proactive).
- Predictive maintenance, combines various sensor readings (condition monitoring), sometimes external data sources and performs powerful analytics on thousands of logged events/data (e.g., simulation, statistical analysis).

It can be enhanced further adding prescriptions to support the mitigation actions.

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[Corrective maintenance	Time-based maintenance	Condition-based maintenance	Predictive maintenance
Indirect costs (consequenc e of failure)				
	Probability of failure not under control. Highest risk of production/ service loss	Probability of failure under control just after the recurrent inspections	24/7 monitoring of data correlated to relevant potential failure causes	Continuous prediction of probability of failure and remaining life
Direct costs (maintenance and spares)				
	No maintenance, just CAPEX to restore at failure	High maintenance costs, due to recurring equipment	Less maintenance costs due to reduced inspections	Lowest maintenance costs only when required



Transition to Predictive Maintenance



Adoption of digital technologies



For most markets, the digital journey lies ahead



IIoT solutions and platform

- Use a platform to integrate a set of enabling technologies that lets you build these solutions more quickly and efficiently.
- Some of the best-in-class industry technologies are:
 - Microsoft's Azure cloud services
 - HPE/Aruba infrastructure
 - IBM Watson's machine learning and AI







Internet of Things

- Manage and minimize risks. Prevent plant downtimes, improve occupational safety, resolve warranty claims and avoid penalties for delays.
- Eliminate inefficiencies. Save energy, reduce labour cost, use resources efficiently, manage lack of skills and generational gaps. Optimize along the value-added chain, what to purchase, how to use, when to replace.
- **Optimize investments**. Accurately engineered plants requiring less redundancies and fewer spare parts and run longer.
- User experience. Offer people a more satisfying way to do things. Flexible configurable functionality, easily scalable fleets, pay-per-use. Easy to use, easy to share.
- Solidify your market position. Attack competitors by doing things in a different way with less risk, higher efficiency and better user experience. Alternatively, defend against someone doing it to you.



















Benefits of Predictive Maintenance



IIoT Digital Powertrain



The IIoT Digital Powertrain is a suite of digital technologies to improve the performance, reliability and efficiency of all components within the powertrain, from **drives** and **motors**, to **pumps, couplings & gearboxes, bearings and other applications**.



Condition monitoring for powertrain





One portal to monitor the complete powertrain

All components can be monitored via one portal – either individually or as part of the complete powertrain.

Benefits

- Transparency on how different powertrain assets work together
- Powertrain analytics of the complete powertrain
- Process optimization possibilities
- Potential for energy savings





Condition monitoring

See the health of your equipment in real time

Availability : Fault status is unknown	Environment : Environment poor: temperature very high, maximum relative humidity 25.6%	Reliability : Model Stress : Reliability OK: faulted < Stress OK 0.1% of the time		
Availability is measured every	5 minutes, all other condition	s every 60 minutes.		
Show details				
Main fan		Auxiliary fan	Auxiliary fan	



Daily impact evaluation

See, on a daily basis, what has an impact on the lifespan of your equipment Daily lifetime impact





Conditionbased maintenance

See the expected lifespan of your equipment based on the health of its components





Predictive maintenance

See the trending data based on actual environmental and usage impact. This will project the expected lifespan of your equipment



Standard aging Standard aging before monitoring Actual aging Actual aging Average prediction Current month Current month Starting month of the component lifetime Condition-Based Maintenance activated Start planning Preventive Maintenance ---- Execute Preventive Maintenance



System evaluation

See the condition status and historical trends of all equipment.





Enterprise-wide Monitoring

See your facilities across the globe in one consolidated dashboard

- Spot problematic assets
- Drill down to perform root cause analysis
- Anticipate faults, operational issues and maintenance needs
- Benchmark data
- Trigger maintenance actions based on condition information





Evaluate energy usage

See energy usage for each piece of equipment





Web portal and app





The web portal is used to:

- Shows trends and historical data
- Manage user access
- Set alerts and alarms



The app provides easy overviews of the status of assets

 Very useful for a technician on the move in a facility







Conclusion



System evaluation

- Reliability managers can quickly look at the need for upcoming maintenance
- One solution to accomplish the goals of all four maintenance strategies









Case Studies



Olam International, Asia

Supplier of food and industrial raw materials

Who is the customer?



- Olam International is a supplier of food and industrial raw materials
- Olam has around 30,000 motors across 70 factories globally. Their reliability and performance is critical for a smooth production

What did they buy?



- IIoT Smart Sensors for LV motors (approx. 100)
- Olam first installed the IIoT Smart Sensor for motors at its cocoa factory in Singapore, followed by its dairy processing plant in Malaysia and its sugar refinery in Central Java, Indonesia.

Why did they buy?

- In the past, the monitoring of a motor was a manual process, consuming time and labor
- The sensors monitor motors remotely, enabling predictive maintenance, substantially reducing downtime and extending equipment life.
- The savings from preventing only one motor failure has already recovered Olam's investment in equipping smart sensors on a number of motors at its factories

https://new.abb.com/news/detail/6529/global-agribusiness-reduces-motors-downtime-with-abb-smart-sensors



Pågen AB, Malmö, Sweden Bakery





- Pågen AB is the leading bakery in Sweden
- Family owned since 1878 with around 1500 employees
- Bakeries are located in Malmö and Gothenburg
- Revenue: 300 MUSD
- High grade of automation
- 2018 investment of 60 MUSD to expand capacity

What did they buy?



- First IIoT Remote Assistance Level 1 Service contract in Sweden with IIoT Condition Monitoring for LV motors
- 12 Ability[™] Smart Sensors and 2 gateways



Why did they buy?



- Replace hand held vibration measurements 4 times/year with IIoT solution for condition monitoring
- Updates 1 time/hour, remote connection
- First problem, high vibrations, discovered within
 48 hours from startup
- Defective fan replaced as planned maintenance without loss of production



CBT and MGP, USA Distributor and beverage producer

Who is the customer?



- MGP is a leading supplier of premium distilled spirits and specialty wheat proteins and starches
- CBT is an authorized distributor that services MGP and introduced them to the sensor

What did they buy?



- IIoT Smart Sensor for mounted bearings
- Ability to monitor bearings on critical equipment
- Ability to schedule maintenance

Why did they buy?



- The customer used an outside monitoring service that provided data on their bearings once a month
- With the IIoT Smart Sensor the data is collected every 15 min providing more accurate information on the condition of the bearings
- Allows them to plan maintenance in advance to prevent unplanned downtime

https://www.youtube.com/embed/BJkChgqNCeM?rel=0&autoplay=1&wmode=transparent



Moving to predictive maintenance improves productivity

• When you address the topics included in this presentation, you can improve plant productivity and the bottom line.











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